

High Temperature Shape Memory Alloy Technology for Inlet Flow Control, Phase II

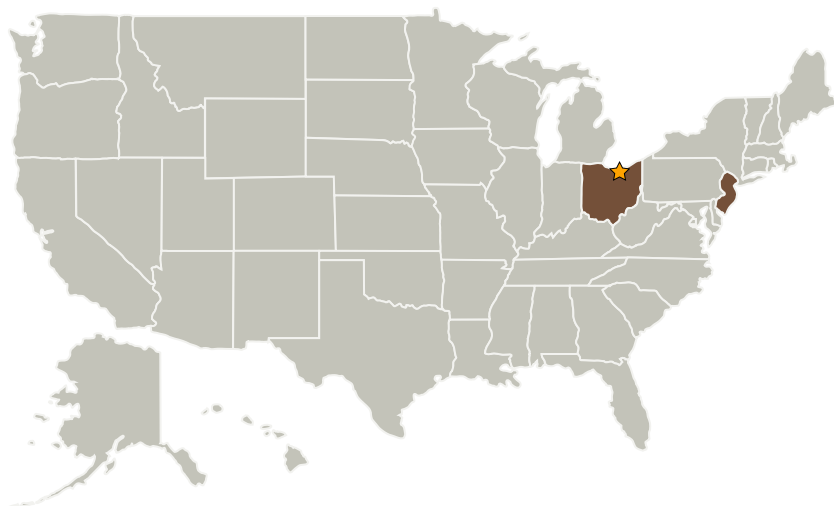
Completed Technology Project (2009 - 2011)



Project Introduction

Recent advances in propulsion, aerodynamic, and noise technologies have led to a revived interest in supersonic cruise aircraft; however, achieving economic viability for these vehicles requires dramatic improvements in cruise efficiency. Optimization of inlet performance offers a potent method for achieving this goal, and a range of conceptual flow control systems are available to address critical problems like blockage, boundary layer bleed, duct length, and flow distortion. By exploiting High Temperature Smart Memory Alloy (HTSMA) technologies, these concepts can be mechanized into robust, compact and lightweight devices, enabling actuators suitable integration into the inlets of supersonic aircraft. The proposed effort leverages prior successful development of solid state smart structures by the investigators in developing of small scale surface-mounted flow control devices as well as large scale actuation systems for inlet ramp mechanisms actuated via HTSMA technology. The proposed Phase II will build upon the Phase I proof of concept study to further develop a fully integrated active supersonic inlet system, including active inlet ramp and deployable flow control devices, as well as the aero/thermo/structural analysis models required to design such systems and subcomponents. In addition, Phase II will be the continued refinement and characterization of actuator-ready HTSMAs.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Continuum Dynamics, Inc.	Supporting Organization	Industry	Ewing, New Jersey

Primary U.S. Work Locations

New Jersey	Ohio
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Project Transitions

**February 2009:** Project Start**June 2011:** Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX15 Flight Vehicle Systems
 - └ TX15.1 Aerosciences
 - └ TX15.1.5 Propulsion Flowpath and Interactions